

Virtual Maternity Care

How Social Networking Technologies Can Improve Prenatal and Postnatal Outcomes, and Lower Costs

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Maternity care is about wellness, not illness. As such, it has major consequences for the world's healthcare systems.¹

In developed nations, most pregnancies and births involve some form of intervention from a systemic maternity service such as a public or private midwifery or community health organization. Clients of maternity care services include pregnant mothers-to-be and mothers of infants, as well as their partners and family members. Even in the small numbers of home births (which accounted for only 2.7 percent of U.K. childbirths in 2010, for example), public or private maternity organizations are usually involved.² These services are crucial to ensuring proper maternal education, positive birth outcomes, and healthy infant development.

In developing countries, progress toward the Millennium Development Goals for maternal health has been slow.³ In addition, "rich versus poor" inequalities in the professional delivery of prenatal care are greater than those in other forms of healthcare.⁴

In both developing and developed nations, maternity services are generally under-resourced. This is due to a number of factors, including staffing and skill shortages in the midwife and community nurse workforces, rising birthrates in some nations (the U.K. birthrate, for example, has risen to its highest level since 1980⁵), and a lack of attention from the healthcare industry, which has been mainly focused on improving acute care needs within hospitals.⁶ It is clear the healthcare industry needs to rethink how maternity services are delivered.

To help with this effort, the Cisco® Internet Business Solutions Group (IBSG) held a series of focus-group workshops in Australia to determine how social networking, collaboration, and other information and communications technology (ICT) solutions could improve the reach and quality of prenatal and postnatal care. The workshops involved 24 expectant mothers, along with a team of midwives and clinicians.

Findings from the work, combined with analysis from Cisco IBSG, suggest that implementing virtual, online maternity services based on collaboration and social networking technologies could dramatically lower costs and improve prenatal and postnatal outcomes. Development of virtual maternity services, together with a redesign of clinical processes and pathways, will enable maternity care teams to focus on cases of greatest need, thereby raising the overall standard of maternity care.

Stresses on Maternity Services

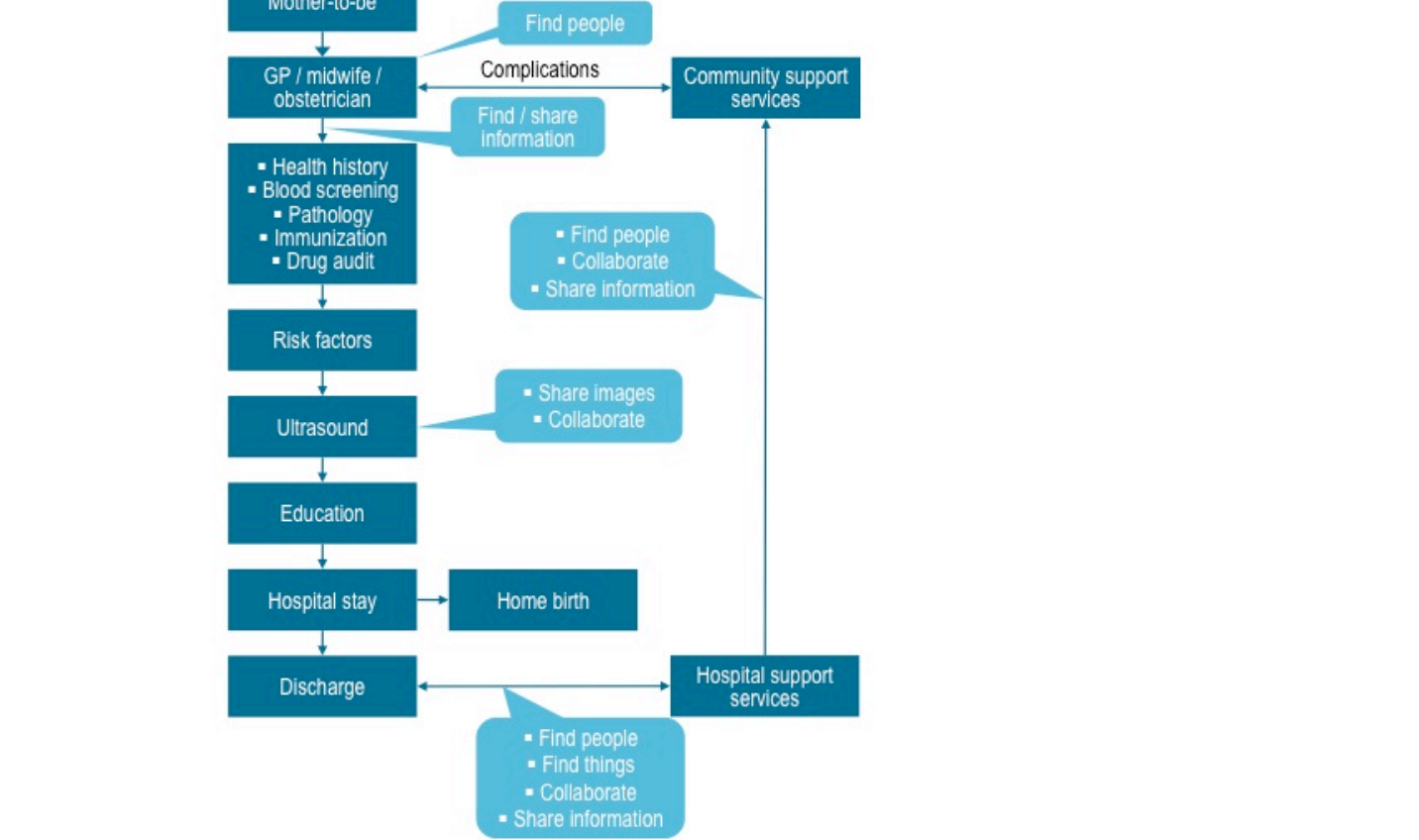
The stresses on maternity services in Australia mirror those of many other developed nations. They include:

- **High cesarean rates.** Excessive cesarean (C-section) rates consume a high amount of health resources. For example, Australia has a cesarean rate three times higher than World Health Organization (WHO) recommendations, with some Australian hospitals servicing 15 percent of C-sections as unplanned emergencies.⁷
- **Unplanned admissions and attendance.** The presentation of unregistered mothers-to-be, some for emergency C-sections, places hospital-based maternity services departments under acute strain. Early identification of complex, non-routine births is essential for optimizing services and resources.
- **Geographic factors.** Small, rural clinics may not have enough resources to handle complex cases. This can result in unplanned transfers to more complex units, whose activities are then disrupted.
- **Cultural factors.** Multicultural and non-English-speaking groups often face challenges receiving services due to language and cultural differences.
- **Prenatal nutrition and high rates of depression.** Each year, approximately 15 percent of new mothers and 10 percent of new fathers in Australia experience perinatal depression.⁸ These rates are typical of many Western countries.
- **Coordination and continuity of services.** Postnatal services may be provided by community nursing, but often cease when mothers check out of the hospital. Postnatal service quality is often compromised by an inability for mothers to make visits and receive advice during the first six months after birth.
- **Lack of accurate, up-to-date, and trusted advice.** One-third of new mothers would like more help or advice in the first month after delivery in the areas of breastfeeding and settling techniques. Nearly two-thirds of mothers seek this advice from family and friends.⁹ Unfortunately, information about these topics is often outdated. There is a need to create, maintain, and make available high-quality, up-to-date information on current best practices in the care of newborn babies.
- **Multiple health record formats.** Although many jurisdictions have deployed electronic health records, these are typically acute-care-centric, with little functionality to support the wider range of events relating to pregnancy and childbirth. Frequently, institutions promote simultaneous use of electronic health records with a paper “baby booklet.” This approach is intended to record a complete medical history of babies, including in-hospital care, early health and development, and vaccination records. Unfortunately, these distinct stores of critical information are not integrated. Birthing events within hospitals are weakly linked to external community child clinic services.
- **Evolution of maternity care services.** In addition to staff shortages, the maternity workforce and birthing facilities are evolving: increasing numbers of midwives are offering private services, and the number of community-based birthing centers is growing. Future service delivery models and supporting ICT systems will need to be flexible enough to accommodate these developments.
- **Proactive planning.** It is often difficult to identify high-risk and potentially complex cases, and to plan delivery of necessary social and clinical interventions ahead of time. As a result, delivery of community nursing and midwife services for such complex, high-cost cases is far from optimal.

Figure 1 illustrates a typical sequence of maternity service delivery activities. Mothers-to-be

Figure 1 Maternity Service Delivery Flow

Mathematics 2022, 10, 1007



The development and execution of individual care plans requires frequent scheduled and

activities may involve professionals in different care organizations in distinct physical locations. The (prospective) parents must comply with the care plan, which often involves a steep learning curve and significant professional support, particularly for first-time parents.

Improving Maternity Care with Social Networking Technologies

Many people using maternity services are familiar with the Internet, email, texting, Facebook, Twitter, and other online means of communication. To quote analyst, researcher, and author Kevin Kruse, “Patients are seeking information, sharing health data, experiences, and opinions, and selecting their treatments more than ever.”¹¹ In addition, a report by Forrester stated that consumers are gaining experience with social media, and they’re extending their activities into healthcare. Twenty-four percent of U.S. online consumers reported engaging in some form of health-related social media at least once each month.¹²

Early Examples

Several leading organizations around the world have begun to move components of their maternity services online. For example:

- **text4baby (U.S.).** Text4Baby is a free mobile service that sends expert health information via SMS text messages to pregnant women and new mothers.¹³
- **NHS Choices (U.K.).** NHS Choices is an interactive, week-by-week pregnancy care planner that allows users to learn about prenatal care, feelings, tests, labor, and birth.¹⁴
- **Remote video (Australia and U.S.).** Remote video at several childbirth facilities in Australia and the U.S. now enables parents and family to view their newborn children.¹⁵
- **Baby Mobile (Netherlands).** Catharina Hospital in Eindhoven offers “Baby Mobile,” which allows parents to visit their babies “virtually” in the hospital using their mobile devices.¹⁶
- **Net Clinic (Finland).** Net Clinic provides maternity services via the Internet, including secure email messages between professionals and parents, patient education, and a discussion forum for participating families.¹⁷

Cisco IBSG Focus-Group Findings

Taking these examples into account, the Cisco IBSG focus groups considered other online services that would be of value, and how they might be included in a “Virtual Maternity Portal” (see Figure 2).

Figure 2. Mock-Up of a Possible Virtual Maternity Portal Homepage.



Source: Cisco IBSG, 2011

The types of services and related support activities considered by the focus group included:

- **Self-service access to information.** Includes basic information such as clinic opening times and contact telephone numbers, as well as rich-media-based information, including podcasts and videos dealing with specific infant care issues (such as difficulties with breastfeeding).
- **Online questionnaires and paperwork.** Offers the ability to complete questionnaires and forms in advance of face-to-face consultations.
- **Peer-group interaction.** Allows interactions among mothers-to-be via email, online forums, or real-time chat and video meetings.
- **Parent-to-professional interactions.** Enables parents to interact with professional support staff via email or scheduled / ad-hoc virtual meetings.
- **Professional-to-professional interactions.** Lets professionals work together online using care-team workspaces with voice, video, and collaborative tool support.

The consensus of the focus groups was that the following features and functions are fundamental to improving maternity services:

- **Registration, initial assessment, and service delivery planning.** Clients must be registered to receive service. This should be an integral part of the process during the early stages of pregnancy. The midwife, a trusted partner in the pregnancy-to-birth process, should provide the needed registration information to allow access to online information resources and virtual perinatal social networking services.

Once registered, clients, mothers, or mothers-to-be can be reached for face-to-face consultations. Clients and midwives would then agree on a plan for managing the pregnancy, delivery, and postnatal period. The plan would also include an information, advice, and virtual services component.

- **Self-service and standard support options.** Clients assessed as low-risk and noncomplex (routine) will be encouraged to adopt a self-service approach by taking higher levels of responsibility and control over their interactions with maternity support services. They could be offered a standard support plan that contains a well-defined and scheduled set of online support services such as relevant information resources, communities of interest, social networking sites, and online classes. Where culturally and technologically appropriate, these clients could also be monitored and managed online or via smartphones. Clients would also be able to transfer to the more intensive support option if desired or required.
- **Intensive support option.** More complex, higher-risk cases will be given intensive, structured support predominantly via face-to-face consultations. These clients can also benefit from access to online services, where appropriate.
- **Information access.** Information will be delivered to clients and their families through an interactive website available 24 hours a day, seven days a week. The site will also include online educational videos for pre- and post- birth periods on popular sites such as YouTube. Client registration details and secure access to specific areas of the wider healthcare network will also be provided.
- **Peer group interaction.** Clients will be able to contact each other via a permission-based mechanism through dedicated chat rooms, moderated blogs, and wiki-based services. Clients will also post their own information, such as videos and pictures, by using freely available social networking sites. Finally, client and midwife satisfaction surveys can be automatically administered.
- **Midwife support and referral services.** Self-administered online assessment tools will be provided for routine data collection, including information about family and medical history, smoking, alcohol, and other lifestyle-related issues. Automation of referrals to appropriate services would be made asynchronously, as required.
Email and text messages can be used for routine correspondence such as booking and confirming appointments. Physical and / or virtual video calls can be used as required or preferred between mothers and midwives—particularly if they are geographically or socially isolated.
- **Care management.** Clients with special conditions will have an electronic care plan linked to the midwife that contains alerts, referrals, and care process steps. The electronic pregnancy record and baby booklet mentioned earlier can also be made accessible to parents.

These virtual maternity services will likely be accessed on a range of devices from three environments:

1. **Home.** Mothers who have access to a PC, tablet, or mobile device (about 75 percent of mothers) could access the portal from home.¹⁸

2. **Clinic, community library, or community center.** Mothers without Internet access or home-based devices could participate in virtual “drop-in” clinics or scheduled midwife consultations using secluded spaces at community facilities.
3. **Hospital or birth center.** Access could be provided using a dedicated virtual maternity workstation in hospitals and birth centers.

There was broad agreement from parents and professionals that social networking and collaboration tools, in combination with redesigned service processes, could be used to provide mothers and mothers-to-be with convenient, multichannel access to midwife support services in a customized, segmented manner. Most important, they agreed that this could significantly improve the quality, effectiveness, efficiency, and reach of perinatal services.

It is important to note that the virtual maternity services considered would not require new buildings or replace existing teams or services. The intended use of social networking technology is to supplement existing services by moving appropriate elements online to make them more accessible to a wider client base.

Virtual Maternity Care Benefits

To our knowledge, there has been no systematic evaluation of the impact of virtual maternity services. Such an evaluation would need to consider the efficiency and effectiveness of maternity care teams on specific clinical outcomes. This step will be required before any virtual maternity services can be deployed on a state and national level.

Even so, based on results from the focus groups, Cisco IBSG firmly believes virtual maternity care services can deliver efficiency and quality improvements in three areas:

1. The adoption of a self-service support model for standard, low-risk patients will enable the redistribution of midwife services. This will allow midwives to focus their attention on patients with the greatest needs.
2. The ability to have real-time online interactions and exchange trusted, high-quality information (within the context of a supportive relationship established physically during the birth process) could improve maternal education, clinic attendance rates, and regulatory compliance.
3. The overall effectiveness of the maternity care team will be improved through enhanced collaboration and coordination.

Although specific clinical and process benefits will vary considerably by country and region, taken together, the benefits in each of the three categories above should be significant. For example, an initial high-level analysis¹⁹ of 2,000 mothers located in the state of Queensland, Australia suggests:

- The number of unregistered mothers will be significantly reduced.
- The rationalization and segmentation of services enabled by combining online and physical services will significantly improve the efficiency and effectiveness of maternity care teams. These improvements will come from better collaboration, a sharper focus on priority cases, and minimizing the number of unexpected and unregistered complex cases.

- The reach of prenatal and postnatal services will be significantly increased, providing care to those who were not able to receive it in the past.
- Improved rates of breastfeeding and the subsequent contribution to improved baby health will deliver an estimated benefit of \$240,000 per year.²⁰
- Staff productivity improvements are estimated at \$677,000 per year.²¹

Next Steps

Healthcare providers that plan to implement virtual maternity services should adopt a structured approach to redesigning their processes and assessing the impact of the changes made. Cisco IBSG's experience working with healthcare providers indicates the process redesign stage is absolutely critical. At a minimum, healthcare providers should:

- Map current (as is) maternity service processes.
- Follow examples of existing virtual maternity services and solutions to develop a "virtual services overlay" that indicates the activities that can be enhanced by adding a virtual service element.
- Map the proposed (redesigned) service model that integrates the desired virtual services.
- Develop a prototype for use with internal staff and external client consultations to prioritize the functionality to be included in the live system.
- Incorporate client satisfaction metrics to gauge their responses to the new virtual maternity services.

By following these steps to deliver virtual maternity care services, healthcare organizations will be able to bring a traditional service area into the information age and in line with expectations from an IT-literate clientele. Most important, they will improve prenatal and postnatal outcomes for patients, while significantly lowering costs for their organizations.

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Endnotes

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3. Under the direction of the United Nations, 189 countries made a promise to achieve eight goals to free people from extreme poverty and multiple deprivations. Taken in 2000, this pledge became known as the Millennium Development Goals to be achieved by 2015. The fifth goal is to improve maternal health.
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5. U.K. Office for National Statistics, 2009, <http://www.statistics.gov.uk/cci/nugget.asp?id=951>
6. Source: "Organization and Delivery of Perinatal Services," Tucker J., et al, *BMJ*, 2004, <http://www.bmj.com/content/329/7468/730>
7. Source: Australian Institute of Health and Welfare, 2010. The proportion of cesarean births that were "elective, planned, or did not involve labor" varied from 46 percent in Queensland to 58 percent in New South Wales. Twenty to 40 percent of women have complications post-operatively (uterine, wound, and urine infections are most common).
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18. Sources: Virtual Maternity workshop survey, Cisco IBSG, 2010; BBC News, July 2010, <http://www.bbc.co.uk/news/10569081>
19. Mothers' samples were of mixed socioeconomic status, including an indigenous population, and spread across a wide rural-urban geography within Queensland, Australia.
20. Cisco IBSG, 2011.
21. Cisco IBSG, 2011.

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More Information

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