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INSIDE:

Montreal physician creates new telemedicine platform

Interoperability headaches eased by VNAs?

How to get things right using an EMR: a checklist for healthcare

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"Medicine, with its dazzling successes but also frequent failures, therefore poses a significant challenge. What do you do when expertise is not enough? What do you do when even the super-specialists fail? We've begun to see an answer, but it has come from an unexpected source – one that has nothing to do with medicine at all … It is a checklist."
– Dr. Atul Gawande

According to Dr. Gawande, an American physician and author, the aviation industry was the first to systematically use the checklist. But the author notes that checklists of sorts have already been used in the healthcare industry (albeit when healthcare was called the practice of medicine and before it was considered an industry.)

Back in 1905, Dr. Nicolai Korotkoff used the stethoscope and an inflatable sleeve to measure blood pressure. That vital sign, combined with the patient's pulse, temperature and rate of respiration, became the focal point of evaluation of a patient's overall clinical status.

The vital signs became such an integral part of clinical evaluation that most of us physicians didn't think of them as a "checklist" until Gawande systematized our thinking.

In his 2009 book, The Checklist Manifesto, Dr. Gawande defined two types of checklists. With the first type, DO-CON-FIRM, the users perform their duties by memory and experience. If they are part of a team, they can perform their duties separately. At some point they pause and run the checklist, to ensure that they had done all that had to be done for the task or process at hand.

With the second type, READ-DO, the users read the checklist item and then perform their tasks. It's as if the checklist were a recipe.

Gawande's penultimate chapter ended with an exhortation to use the checklist tool in healthcare, because "it's time to try something else" other than "working harder and harder to catch the problems and clean up after them."

The theory of the 3 Rs and the electronic health record: The checklist manifesto is similar to two ideas that are already in healthcare and which overlap with Gawande's thesis. One of these is the theory of the 3 Rs of healthcare quality and the other is the use of the concept processor as the semantic engine in an electronic health record – a system used in the Praxis EMR (www.praxisemr.com).

The concept processor can in fact be seen as holding a collection of checklists, although I had not used the term "checklist" in this context prior to reading Gawande's book.

The theory of the 3Rs in healthcare is related to Gawande's checklist thus: The theory states that a Reminder (of what a provider should do in a particular type of case or clinical situation) is the same as what should appear in the medical record (the SOAP note) and both of these are the same as the Review (which can be done by the provider or carried out by the clinic's medical director or performed by an outside agency).

The Reminder can be in the form of a checklist and, by virtue of the nature of the concept processor, the healthcare practitioner is reminded what elements are included in management of specific cases (the assessment), in real time.

Although the theory was conceived in 1999 (toward the end of the era of the paper-based medical record), I had already been working with the concept processor for seven years and I knew that eventually it would be possible to bring the theory to life via the electronic health record, using the concept processor. The Reminder is a checklist whose elements are in the SOAP note (Subjective, Objective, Assessment and Plan).

When we consider that the concept processor is centered around the familiar SOAP system of Progress Note generation, and that each section of the SOAP Note can be "pre-programmed" to contain information specific to the Assessment, Gawande's checklist is seen to be embedded in all of these sections of the SOAP note as Assessment-specific SOAP Note elements, which are equivalent to checklist items.

With the concept processor, there is no need to limit the number of items to be checked. One simply enters the number of items related to the appropriate portion of the SOAP note. The "checklists" can be entered by the practitioner during day-to-day work or they can be imported from another Praxis user's knowledge base via the Knowledge Exchanger.

Let's look at a concrete example of the use of the concept processor in handling what has become a fairly common case: the adrenal incidentaloma. Let's further assume that it is a single, unilateral mass, found by CT scan while investigating another problem. The imaging report (which

by definition revealed the presence of the tumor) will have provided the initial data, which becomes the first sentence of the Subjective portion of the SOAP note.

Subjective: this patient underwent a CT scan which revealed a single [2 cm] mass in the [left right] adrenal gland.

Adrenal tumors (whether incidental or symptomatic) can be primary or secondary (metastatic), and if primary they can be benign or malignant and, whether benign or malignant, they can functioning or non-functioning.

In reference to the possibility of metastatic disease, the Subjective note can be expanded thus:

Subjective: this patient underwent a CT scan which revealed a single [2 cm] mass in the [left right] adrenal gland. The patient has no history of cancer of the lung, gastrointestinal tract, kidney or breast and no history of lymphoma.

Because adrenal tumors can overproduce their normal hormones, the Subjective note can be further expanded:

Subjective: this patient underwent a CT scan which revealed a single [2 cm] mass in the [left right] adrenal gland. The

> **Checklists enable us to work smarter, instead of harder, to catch problems in healthcare and improve quality.**

patient has no history of cancer of the lung, gastrointestinal tract, kidney or breast and no history of lymphoma. There is no history of hypertension, diabetes or hypokalemia (to indicate Cushing syndrome of hypercortisolism or Conn syndrome of hyperaldosteronism) and no history of sweating episodes, headache and palpitations (to indicate the presence of pheochromocytoma).

If the patient is female, the Subjective note can continue:

Subjective: this patient underwent an imaging procedure [CT scan] which revealed a single [2 cm] mass in the [left right] adrenal gland. The patient has no history of cancer of the lung, gastrointestinal tract, kidney or breast and no history of lymphoma.

There is no history of hypertension, diabetes or hypokalemia (to indicate Cushing syndrome of hypercortisolism or Conn syndrome of hyperaldosteronism) and no history of sweating episodes, headache and palpitations (to indicate the presence of pheochromocytoma).

There is no history of hirsutism or other signs of masculinization (to indicate excessive testosterone production).

The nature of the concept processor is such that, with very little effort, a separate case can be constructed for adult females as distinct from adult males, so that the reference to hirsutism does not appear in the SOAP note for adult males. And of course, separate cases can be constructed for female children and male children.

The Objective section will contain general examination elements and the physical examination findings that are usually present in patients with Cushing syndrome, Conn syndrome and pheochromocytoma. It too acts as a checklist, reminding the practitioner that certain physical examination features are associated with these disorders.

The examination can be extremely detailed, with features included from textbook and other sources. The practitioner reads the Objective text just prior to examining the patient and then performs the physical examination. This follows the dictum of "doing what you wrote rather than writing what you did."

In female patients this will include mention of the presence or absence of hirsutism and other features of masculinization. Creating a separate case for adult females, and selecting that case as appropriate, speeds the process of creating the SOAP Note for Adrenal incidentaloma, initial visit based on the sex of the patient.

The Plan section is where the checklist function of the concept processor has an additional, major impact not only on quality of care but also on efficiency of office operation.
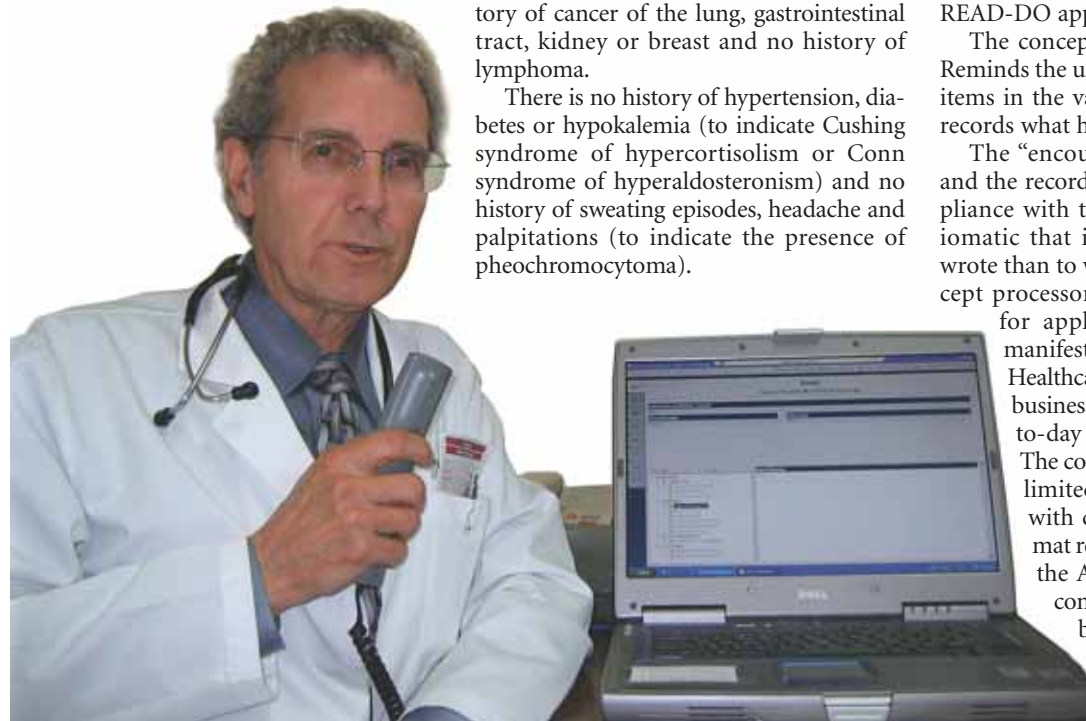
The majority of the time, the healthcare provider using the concept processor will use the READ-DO method. During medical encounters it works better than the DO-CONFIRM method, which is the traditional method of managing the encounter and its recording within the patient chart.

The more complex the case, the more advantageous is the concept processor's READ-DO approach.

The concept processor simultaneously Reminds the user of what to do (follow the items in the various SOAP elements) and records what has been done.

The "encounter" is both the checklist and the recording device that shows compliance with the checklist. Since it is axiomatic that it is easier to do what you wrote than to write what you did, the concept processor is an efficient technology for applying Gawande's Checklist manifesto to clinical practice.

Healthcare is complex not only in its business aspects, but also in its day-to-day patient encounter aspects. The concept processor can hold unlimited amounts of information, with checklists in structured format readily available for use within the Assessment of any case. The concept processor, with its embedded checklists, thus makes routine the reliable management of complexity in health care.

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